IN THE CLAIMS:

1. (Amended) A digital filter for filtering sample data, comprising:

a delay network for delaying input sample data to provide a plurality of delayed sample data outputs;

a filter network representable by a decomposed coefficient weighting matrix for processing said delayed sample data outputs; and

a processor for producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix, said processor being responsive to a sample spatial position index signal in producing said filtered output.

2. (Original) A digital filter according to claim 1, wherein
said decomposed coefficient weighting matrix comprises a structurally factored matrix.

3. (Original) A digital filter according to claim 2, wherein
said structurally factored matrix employs a factor derived based on a property including at least one of, (a) coefficient matrix row symmetry, and (b) coefficient matrix column symmetry.

4. (Original) A digital filter according to claim 1, wherein
said decomposed coefficient weighting matrix is derived by at least one of (a) factoring a first coefficient weighting matrix with a common row factor, and (b) factoring a first coefficient weighting matrix based on at least one of, (i) coefficient matrix row symmetry, and (ii) coefficient matrix column symmetry.

5. (Original) A digital filter according to claim 1, wherein
said decomposed coefficient weighting matrix is derived by factoring a first coefficient weighting matrix using a sparse matrix.

6. (Original) A digital filter according to claim 1, wherein

said decomposed coefficient weighting matrix represents a multiple input, multiple output, filter network.

7. (Original) A digital filter according to claim 1, including

an interpolation network for interpolating sample data to provide said input sample data.

8. Canceled.

9. (Original) A digital filter according to claim 1, wherein

said processor includes a factor combiner for deriving a weighted sum of factors representing a linear transform process.

10. (Original) A digital filter according to claim 1, wherein

said decomposed coefficient weighting matrix exhibits the form

$$\frac{\begin{bmatrix} 0 & 0 & 3 & 0 \\ -1 & 4 & -2 & -1 \\ 1 & -1 & -1 & 1 \end{bmatrix}}{3}.$$

11. (Original) A digital filter according to claim 1, wherein

said digital filter provides the function

$$H(z) = \begin{bmatrix} 1 & \mu & \mu^2 \end{bmatrix} \cdot \frac{\begin{bmatrix} 0 & 0 & 3 & 0 \\ -1 & 4 & -2 & -1 \\ 1 & -1 & -1 & 1 \end{bmatrix}}{3} \cdot \begin{bmatrix} 1 \\ z^{-1} \\ z^{-2} \\ z^{-3} \end{bmatrix}$$

where u is a sample spatial position representative signal and z represents an input sample.

12. (Original) A digital filter according to claim 1, wherein

said decomposed coefficient weighting matrix exhibits the form

$$\frac{\begin{bmatrix} 6 & 58 & 58 & 6 \\ 23 & 59 & -59 & -23 \\ 31 & -31 & -31 & 31 \\ 16 & -48 & 48 & -16 \end{bmatrix}}{128}.$$

13. (Original) A digital filter according to claim 1, wherein

said digital filter provides the following function, where u is a sample spatial position representative signal and z represents an input sample

$$H(z) = \begin{bmatrix} 1 & \mu & \mu^2 & \mu^3 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & 0 & \frac{3}{64} & 0 \\ 0 & 1 & 0 & \frac{23}{128} \\ 0 & 0 & \frac{31}{128} & 0 \\ 0 & 0 & 0 & \frac{1}{8} \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & -1 & -1 & 1 \\ 1 & -3 & 3 & -1 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ z^{-1} \\ z^{-2} \\ z^{-3} \end{bmatrix}.$$

14. (Canceled)

15. (Original) A method ~~according to claim 14, wherein~~ for filtering sample data, comprising the steps of:

delaying input sample data to provide a plurality of delayed sample data outputs;

processing said delayed sample data outputs using a filter network represented by a structurally factored coefficient weighting matrix, said structurally factored matrix ~~comprises~~ comprising a coefficient weighting matrix employing factors derived based on a property including at least one of, (a) coefficient matrix row symmetry, and (b) coefficient matrix column symmetry; and

producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix.

16. (Original) A method ~~according to claim 14, wherein~~ for filtering sample data, comprising the steps of:

delaying input sample data to provide a plurality of delayed sample data outputs;

processing said delayed sample data outputs using a filter network represented by a structurally factored coefficient weighting matrix, said structurally factored matrix ~~is~~ being derived by at least one of (a) factoring a first coefficient weighting matrix with a common row factor, and (b) factoring a first coefficient weighting matrix based on a property including at least one of, (i) coefficient matrix row symmetry, and (ii) coefficient matrix column symmetry; and

producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix.

17. (Amended) A method for filtering sample data, comprising the steps of: ~~A method according to claim 14, wherein~~

delaying input sample data to provide a plurality of delayed sample data outputs;

processing said delayed sample data outputs using a filter network represented by a structurally factored coefficient weighting matrix, said structurally factored matrix ~~comprises~~ comprising a decomposed coefficient weighting matrix derived by factoring a first coefficient weighting matrix using a sparse matrix; and

producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix.

18. (Original) A method for filtering sample data, comprising the steps of:

delaying input sample data to provide a plurality of delayed sample data outputs;

processing said delayed sample data outputs using a filter network using a coefficient weighting matrix comprising,

$$\frac{\begin{bmatrix} 0 & 0 & 3 & 0 \\ -1 & 4 & -2 & -1 \\ 1 & -1 & -1 & 1 \end{bmatrix}}{3}\text{; and}$$

producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix.

19. (Original) A method for filtering sample data, comprising the steps of:

delaying input sample data to provide a plurality of delayed sample data outputs;

processing said delayed sample data outputs using a filter network using a coefficient weighting matrix comprising,

$$\frac{\begin{bmatrix} 6 & 58 & 58 & 6 \\ 23 & 59 & -59 & -23 \\ 31 & -31 & -31 & 31 \\ 16 & -48 & 48 & -16 \end{bmatrix}}{128}\text{; and}$$

producing a filtered output by computing a weighted product summation of said delayed sample data outputs and said coefficient weighting matrix.